

Stratigraphic Controls on Production Behaviour: M1-Jintan Carbonate Gas Fields, Offshore Sarawak

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This paper offers interesting insights on the stratigraphic controls/ deposition architecture resulting in baffles which impact production behavior on the M1 and Jintan carbonate gas fields of the Mega Platform, Offshore Sarawak, Malaysia. Fields of the Mega Platform were developed assuming a depletion drive. However, production data suggests a strong aquifer drive, with low recovery factors. In addition, the geological control on production behavior was thought to be simple i.e flow tanks with little or no baffling.

Issues relating to the complex nature of these carbonate reservoirs include: (1) In early 2004, the horizontal well M1-110S1, located some 30 ft below the top reservoir, watered out unexpectedly after two years of high production offtake rates. The watering out of M1-110 can be explained by a different reservoir architecture and the reduction in kv/kh (baffling) across boundaries within the aquifer. The low vertical permeability caused water to bypass gas, resulting in water production in M1-110S1; (2) The early stage of the development of the Jintan field in 2004 (4 horizontal wells high up in the structure) saw a drastic drop in pressure and offtake within a few months of production. This was due to baffling in the underlying transgressive limestones, which reduced vertical pressure communication.

Tools and work processes employed to overcome these issues include: (1) Semi-regional/inter-field correlation; (2) Acquisition of additional core and a re-look at the existing core stratigraphy; (3) Usage of mini-permeability data for kv/kh; (4) OBC 4C 2-D seismic for imaging internal reservoir architecture (M1); (5) Generation of a detailed semi -regional static and dynamic model for history matching.